

K1: Scoping the Environmental Impacts of airports and airfields

Explanatory Note

For projects which require Environmental Impact Assessment (EIA), a scoping exercise must be undertaken early in the planning stages of the project. This enables the project to be designed to avoid or minimize negative environmental impacts and provides an opportunity to incorporate positive environmental enhancements into the project. Early consultation with all interested parties, including the Environment Agency, is an essential part of scoping. Even if a project does not require EIA under EIA legislation, it may be advisable (and in some cases necessary) to undertake a scoping exercise in any case (e.g. to support applications for other relevant consents and authorisations needed to carry out the project).

This guidance note aims to promote a good practice approach to scoping as part of the EIA process which in some respects goes beyond the statutory EIA requirements. When scoping a project, developers, or their consultants, should satisfy themselves that they have addressed all the potential impacts and the concerns of all organisations and individuals with an interest in the project.

This guidance note provides information on the most likely potential environmental impacts of airports and airfields. However, each project must be considered on a case-by-case basis as the detailed characteristics of the proposal and the site will determine the potential impacts.

This guidance is based on the main legal requirements on EIA stemming from the EC Directive and the UK Regulations. However, developers should seek independent legal advice to ensure that the proposed development is carried out in compliance with the requirements of this and any other relevant legislation, relating to planning as well as pollution control.

This guidance note must be read in conjunction with the *Scoping Handbook*, which provides general guidance on the Environmental Impact Assessment process and the scoping of projects.

In addition, the following scoping guidance notes are also relevant to *all* airports and airfield projects:

- ◆ A1 Construction works
- ◆ A4 Vegetation management and conservation enhancements
- ◆ K7 Vehicle parks and park-and-ride schemes

The following scoping guidance notes *may* be relevant in certain circumstances:

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- ◆ A3 Redevelopment and clean-up of contaminated land
 - ◆ B3 Control of pest species, including disease vectors
 - ◆ B4 Deliberate introduction of non-native and genetically modified species
 - ◆ E4 Retail and out-of-town shopping parks
 - ◆ K2 Light transit systems and tramways
 - ◆ K4 New roads, road widening and other road improvement schemes
 - ◆ K5 Railways and railway stations

Contents

- 1. Introduction**
 - 2. Development control and EIA**
 - 3. Potentially significant environmental effects**
 - 4. Mitigation measures**
 - 5. References and further reading**
-
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1. Introduction

- 1.1 This guidance note, in conjunction with the Scoping Handbook and the other notes listed on the previous page, seeks to help developers and other interested parties identify the potential impacts of airports and airfields on the environment as a whole. It should be emphasised that the list of impacts is by no means exhaustive and that a full investigation into *positive* and *negative* impacts should be undertaken. Early consultation with the Environment Agency, and other relevant organisations, will enable the identification of environmental issues and constraints and the avoidance of sensitive areas, thus reducing the need for redesigning and mitigating avoidable impacts at a later stage.
- 1.2 Following this brief introduction, a brief overview of the legal requirements for EIA in relation to airports and airfields is provided. The potential environmental impacts of such projects are identified in Section Three. The text and summary table in this section will enable the reader to begin to identify the likely impacts arising from the particular proposal under consideration. The subsequent sections present the mitigation measures that may be relevant to airports and airfields, followed by key references and further reading.

Background to development type
- 1.3 Activities at airports and airfields involve large construction operations followed by heavy usage. This is likely to involve irreversible impacts on flora and fauna. Such projects provide a valuable link into integrated transport strategies and can provide extensive economic benefits for communities. However, there is potential for significant impacts and good management is a key requirement. Therefore a thorough scoping exercise and careful consideration of alternatives are of prime importance.

2. Development control and EIA

- Development Control*
- 2.1 Development of airports and airfields are likely to require planning permission under the Town and Country Planning regime and will, therefore, be likely to require planning permission. Developers should contact their Local Planning Authority to confirm whether or not their proposals require planning permission (or are subject to any other form of development control). They should also seek advice on the impact on their proposals of other planning-related legislation (for example the Conservation (Natural Habitats etc.) Regulations 1994).

Environmental Impact Assessment

- 2.2 Airport and airfield developments are included in the Schedules to the EIA Regulations; Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 1999 No. 293). The Regulations list applicable thresholds and criteria which apply to Schedule 1 and Schedule 2 developments. If the thresholds are not exceeded, then EIA is not required and so these thresholds and criteria are termed “exclusive criteria”. In cases where the thresholds are exceeded, Schedule 1 developments require an EIA (mandatory) but Schedule 2 developments only require an EIA if the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location. The exclusive criteria for Schedule 1 developments are taken from the EIA Directive, but those for Schedule 2 developments have been laid down in the UK Regulations, as provided for by the Directive. In addition to the specific criteria and thresholds set out in Schedule 2, all developments listed in Schedule 2 may require an EIA if any part of the development is to be carried out in a sensitive area.
- 2.3 The DETR has published guidance (referred to in the Scoping Handbook) which helps in the decision on whether, in respect of Schedule 2 projects, impacts are significant and whether EIA should be required. The guidance thus contains “indicative criteria”, although area sensitivity and project-specific issues must be taken into account and the decision is still discretionary. The following criteria apply:

- ◆ Exclusive criteria
Schedule 1 (mandatory EIA) includes, under paragraph 7 (a), “Construction of ... airports with a basic runway length of 2,100 metres or more.”

Under Schedule 2, paragraph 10 (e), EIA may be required for the construction of airfields (unless included in Schedule 1) if: (i) the development involves an extension to a runway; or (ii) the area of the works exceeds one hectare.

- ◆ Indicative criteria
Concerning the construction of airfields, Annex A of the Department of the Environment, Transport and the Regions Circular 02/99, *Environmental Impact Assessment*, states that, “The main impacts to be considered in judging significance are noise, traffic generation and emissions. New permanent airfields will normally require EIA, as will major works (such as new runways or terminals with a site area of more than 10 hectares) at existing airports. Smaller scale development at existing airports is unlikely to require EIA unless it would lead to significant increases in air or road traffic.

Furthermore, EIA may be required for any change to or extension of airport or airfield developments already authorised, where the change or extension may have significant adverse effects on the environment. Responsibility for determining whether an EIA is required lies initially with the local planning authority.

- 2.4 Whether or not a formal EIA of a proposed airfield is required, the Environment Agency and other statutory consultees and regulators may request environmental information concerning the proposal. An EIA may provide the most appropriate method for a developer to collate the necessary information.

Other licences, consents and authorisations

- 2.5 Certain aspects of an airport development, such as the diversion of a stream away from the line of a runway, may require prior permission from the Environment Agency. These may include, for example, land drainage consents, abstraction licences, impounding licences and discharge consents. It is recommended that the developer seek independent legal advice and

liaise with the Environment Agency during project design and subsequent stages to identify the consents, licences and authorisations that will be required.

- 2.6 The Civil Aviation Authority (CAA) has a very powerful influence on airport development, and on the realignment of watercourses. At Gatwick the River Mole has been diverted to make way for airport development, and the CAA has required that large parts of the diversion closest to the airside part of the airport be covered over to prevent their use by wildfowl which can increase the risk of airstrikes. At Heathrow Terminal 5, the original plan to put the last remaining length of open watercourse across the site into an inverted siphon (culvert) was successfully resisted by the Agency. However, the alternative, a diversion channel around the end of the runway, was not viewed kindly by the CAA, who required it not only to be covered, for the same reason as at Gatwick, but also that it should not provide a continuous ‘visual flightpath’ as there is a view that some birds follow the line of rivers and canals, even if they do not alight on the water. These parts were to be obscured to view from above.

3. Potentially significant environmental issues

- 3.1 The EIA Directive requires the EIA to ‘identify, describe and assess...the direct and indirect effects of a project on the following factors: human beings, fauna and flora; soil, water, air, climate and the landscape; material assets and the cultural heritage; [and] the interaction between the [above] factors.’ Socio-economic issues, health and safety in the workplace, material assets and the cultural heritage are all considered in EU Guidance on scoping (ERM, 2001a) but are not impacts categories for which the Environment Agency is the principal competent authority. Advice on these issues is presented in this guidance note without prejudice to the advice of the relevant competent authority, but the relevant competent authority should be consulted for each of these categories in all cases (further advice on the appropriate competent authority to contact is given in the Scoping Handbook).
- 3.2 An EIA of any proposed airport or airfield should determine the potential impacts on the environment of each aspect of the project, including location and management. Careful scoping facilitates this process. This section provides a non-exhaustive description of the environmental issues that might arise during the scoping of such a project. The Scoping Handbook provides guidance on how to conduct a scoping exercise.
- 3.3 Airport and airfield developments have the potential to affect the environment in many ways. They can differ widely in terms of their mode of operation and location, and key issues are likely to vary from site to site. Therefore, it is recommended that expert advice on detailed technical issues should be obtained. The issues arising for all environmental receptors will change overtime as the development moves from the construction phase to the operational phase, and may continue to change with expansion in years to come. Developers and site operators should therefore consider the impacts arising from construction activities, initial operation and forecasted expansion.
- 3.4 Environmental impacts can affect both humans and ecological resources. Potential impacts are discussed here in broad terms only as their nature and intensity will depend on the physical characteristics of the project and the composition of any polluting materials. An EIA of proposed airport and airfield developments should take these factors into account in assessing potential impacts on the environment.
- 3.5 The following paragraphs should be read in conjunction with Table K1. This details the activities involved in the preparation and on-going management of airport and airfield developments, and the impacts arising from them.

Water environment

- 3.6 Surface water hydrology can be affected during both construction and operation of airports and airfields. The construction of buildings, runways, car parks and associated infrastructure can result in compaction of soils and will lead to an increase in impermeable (or low permeability) surfaces. The subsequent increase in surface runoff may, in turn, increase the risk of flooding and soil erosion. Work near watercourses can lead to increased erosion and may affect bank stability.
- 3.7 Airports and airfields are usually built on relatively flat land, although it is almost certain that some earthmoving will be required in order to provide the minimum gradients that are required operationally. However, such areas of flat land often include the floodplains of watercourses. It is essential that both the floodplain storage and the floodplain conveyance be maintained during and after construction, in order that flood risks both upstream and downstream are not exacerbated.
- 3.8 Surface water quality could be affected by a number of factors during construction and operation of airports and airfields operations. Construction activities may encourage soil erosion and increase the sediment loads of nearby streams, while accidental leaks or spills of oil or fuel from construction vehicles can also pollute waters. Once operational, there is a continual risk of spillages from ground vehicles, traffic to the airport and aircraft, as well the possibility of contamination from aircraft maintenance activities, including spraying with de-icer to allow flights during cold periods, paint stripping and disposal / use of fire fighting foams.
- 3.9 Construction and operational activities may have significant impacts on the groundwater environment. The site is likely to be less permeable, resulting in reduced recharge if site drainage is directed to the surface water system. The main threat to groundwater quality is the possible contamination by spillages of fuels, de-icer, paint stripping chemicals and other chemicals in use on the site.
- 3.10 In order to protect vulnerable groundwater resources it is the policy of the Environment Agency to encourage new, potentially polluting developments to locate in areas where groundwater is less vulnerable to pollution, and away from the catchment of sensitive abstractions. Further guidance is provided in the Agency's Policy and Practice for the Protection of Groundwater (Environment Agency, 1998a). However, this policy does not imply an automatic prohibition on airport and airfield projects within Source Protection Zones.

Land

- 3.11 Airport and airfield projects will have implications for the physical characteristics and land use of the site. By their nature, such projects have the potential to change the site significantly. Issues to consider include: the effect on landscape character of the airport or airfield; the associated infrastructure, including navigational towers; the loss of mature trees due to height restrictions on flight paths and, importantly, the direct loss of soil from what is likely to start out as flat land.

Air and Climatic Factors

- 3.12 Airports and airfields have the potential to affect local air quality and climate, and to contribute to global climate change. NO_x emissions from aircraft are likely to provide a significant proportion of the emissions from the area as a whole, and hydrocarbon and carbon monoxide emissions can be high – particularly whilst the aircraft are idling on the ground. In addition, vapour trails can significantly reduce solar radiation reaching the ground surface, and the high-level emissions from aircraft will contribute to global warming. There will be significant land-take and associated loss of soil and the potential for soil contamination from runoff during construction and when runways are complete from runoff.

Ecology

- 3.13 The removal of native vegetation, and its replacement with a paved area will destroy both aquatic and terrestrial habitats. Mature trees are likely to be lost, as are ponds and hedgerows. In addition, ecological impacts may operate over a longer timescale, as populations take time to respond to environmental changes. The noise and pollution from the airport / airfield may have long term implications on the flora and fauna and may drive some species away from the local area. In particular, severance from such a large development may be a cause for concern.
- 3.14 The Civil Aviation Authority (CAA) exerts a strong influence and must be contacted. At Heathrow, for example, some planting has been proposed by the new link road. The CAA, however, have requested the right to cut down all trees if they prove to be a roosting site for flocks of birds that could cause a bird strike. CAA have jurisdiction beyond the airport boundary, and can take action to destroy a roost if they consider it poses a threat.

Human environment

- 3.15 The potential impacts of an airport or airfield development on the human environment may take a variety of forms. They are divided here into sections covering socio-economic and health issues; amenity, visual impact and nuisance issues; and culture, heritage and archaeology.
- 3.16 The potential for socio-economic and perceived health impacts arising from airports or airfields is likely to be very large. Airports usually require high staffing levels and the related supply chains will also need to take on more staff. However, such social issues, should be considered when scoping an EIA. In addition to the amenity, visual impact and nuisance issues noted below, these may include stress illnesses induced by perception of people living close to the proposed development about dropping house prices and increasing noise and air pollution.
- 3.17 The identification of which of these issues are significant or are perceived to be significant is an important function of public involvement during the scoping exercise. Understanding likely public concerns is a key issue and reference to experiences from other airport and airfield developments and any public representations to the local planning authority should be made.
- 3.18 Amenity, visual impact and nuisance issues that commonly need to be addressed are the visual impact of the airport or airfield, and noise and vibration nuisance from aircraft and ground transport associated with the development, the latter during both construction and operation of the site. Any restrictions to access that may arise as a result of the development should also be considered, as should the creation of nuisances such as odour from the aeroplane engines.
- 3.19 Direct impacts on architectural and archaeological heritage can occur at the construction stage of these developments, with the potential for damage during the operational stage due to high noise levels and vibration from low flying aircraft. The likelihood of there being any unrecorded sites and the site's influence on the potential for discovery should also be examined.

Table K1

- 3.20 The impact identification table highlights:
- ◆ sources of impact (development activities);
 - ◆ potential impacts;

- ◆ receptors for these impacts.

3.21 It is recommended that the table is annotated and used during consultations with other interested parties. Reference should also be made to the prompt lists detailing impacts and sources of impacts in the Scoping Handbook.

Table K1. Summary of Key Potential Impacts of airports and airfields

Potential Receptors of Impact		Activities and Potential Impacts		
		Construction phase	Operation phase/on-going site maintenance	Decommissioning / Post-operation
WATER	surface water resources & channel morphology	<p>Use of vehicles and machinery</p> <ul style="list-style-type: none"> increase in surface runoff from soil compaction <p>Works next to or near water courses</p> <ul style="list-style-type: none"> change in flow velocities increased erosion and subsequent changes in bed and bank stability increased flood risk <p>Earthworks</p> <ul style="list-style-type: none"> increased sedimentation of water courses loss of floodplain, leading to increased risk of flooding, perhaps remote from the site 	<p>Use of vehicles and machinery</p> <ul style="list-style-type: none"> increase in surface runoff from runways and other paved areas <p>Site drainage</p> <ul style="list-style-type: none"> rapid transfer of rainwater to water courses via drains changes to flow regimes of water courses downstream of the airport / airfield change in deposition regime, caused by changes in flow and possible increase in sediment input from soil erosion increased flood risk <p>Topography</p> <ul style="list-style-type: none"> loss of floodplain, leading to increased risk of flooding, perhaps remote from the site 	<p>Removal of paved surfaces</p> <ul style="list-style-type: none"> possible decrease in surface runoff <p>Works next to or near water courses</p> <ul style="list-style-type: none"> change in flow velocities increased erosion and subsequent changes in bed and bank stability increased flood risk
	surface water quality	<p>Earthworks</p> <ul style="list-style-type: none"> pollution from suspended material disturbance of contaminated soil and subsequent pollution of water courses <p>Materials management</p> <ul style="list-style-type: none"> pollution from spills or leaks of fuel, oil and construction materials 	<p>Materials management</p> <ul style="list-style-type: none"> pollution from spills or leaks of fuel and oil Glycol contamination (from de-icing) paint stripping chemical contamination pesticides contamination contamination from use or disposal of fire-fighting foams 	<p>Earthworks</p> <ul style="list-style-type: none"> pollution from suspended material disturbance of contaminated soil and subsequent pollution of water courses <p>Materials management</p> <ul style="list-style-type: none"> pollution from spills or leaks of fuel, oil and construction materials
	groundwater resources	<p>Earthworks and site drainage</p> <ul style="list-style-type: none"> reduction in water table reduction in recharge changes to groundwater distribution and flow 	<p>Physical presence of paved areas</p> <ul style="list-style-type: none"> continued alteration of groundwater flow 	<p>Earthworks</p> <ul style="list-style-type: none"> increase in water table increased recharge changes to groundwater distribution and flow
	groundwater quality	<p>Earthworks</p> <ul style="list-style-type: none"> disturbance of contaminated soil and subsequent groundwater pollution <p>Materials management</p> <ul style="list-style-type: none"> pollution from spills or leaks of fuel, oil and building materials 	<p>Materials management</p> <ul style="list-style-type: none"> contamination from spills or leaks of fuel and oil Glycol contamination (from de-icing) paint stripping chemical contamination pesticides contamination contamination from use or disposal of fire-fighting foams 	<p>Earthworks</p> <ul style="list-style-type: none"> disturbance of contaminated soil and subsequent groundwater pollution <p>Materials management</p> <ul style="list-style-type: none"> pollution from spills or leaks of fuel, oil and building materials

Potential Receptors of Impact		Activities and Potential Impacts		
		Construction phase	Operation phase/on-going site maintenance	Decommissioning / Post-operation
LAND	landscape	Excavations & earthworks <ul style="list-style-type: none"> creation of a new landform 	Physical presence of airport/airfield <ul style="list-style-type: none"> change in character of landscape large area lit at night tall navigational aids 	Earthworks <ul style="list-style-type: none"> short-term impact of construction site followed by improved landscape feature
	soils	Use of vehicles and machinery <ul style="list-style-type: none"> compaction erosion Earthworks <ul style="list-style-type: none"> land-take and associated loss of soil further erosion of exposed soil removal or alteration of soils on site 	Use of runways <ul style="list-style-type: none"> runoff from runways containing contaminants that may be deposited on soils emissions with short range deposition for some contaminants (e.g. lead and zinc) Spills <ul style="list-style-type: none"> contamination of soil from spills or leaks of fuel and oil, glycol (from de-icing), paint stripping chemicals and pesticides 	Use of vehicles and machinery <ul style="list-style-type: none"> compaction erosion Earthworks <ul style="list-style-type: none"> further erosion of exposed soil removal or alteration of soils on site
	geology	Excavations <ul style="list-style-type: none"> possible removal of rock by excavation works 	Excavations <ul style="list-style-type: none"> further removal of geological resource following site expansion 	

AIR	local air quality	Use of vehicles and machinery <ul style="list-style-type: none"> emissions from construction site traffic dust generation 	Aircraft activity <ul style="list-style-type: none"> NO_x emissions tend to be significant CO and HC emissions – particularly due to on the ground aircraft idling Odour associated with aircraft Transport to airport/airfield <ul style="list-style-type: none"> exhaust emissions 	Decommissioning <ul style="list-style-type: none"> improvement in local air quality
	regional / global air quality		Aircraft activity <ul style="list-style-type: none"> reduction in ground-level solar radiation high-level emissions contributing to global warming 	

Potential Receptors of Impact		Activities and Potential Impacts		
		Construction phase	Operation phase/on-going site maintenance	Decommissioning / Post-operation
FLORA & FAUNA	aquatic ecology	<p>Drainage works and use of vehicles</p> <ul style="list-style-type: none"> negative impact on flora and fauna from increased sediment loading of streams <p>Materials management</p> <ul style="list-style-type: none"> harm to aquatic flora and fauna from oil, fuel, cement or other substances entering watercourses <p>Earthworks and excavations</p> <ul style="list-style-type: none"> habitat removal, fragmentation or severance – loss of ponds in particular 	<p>Site drainage</p> <ul style="list-style-type: none"> indirect effect on aquatic flora and fauna from ongoing changes to stream hydrology and morphology <p>Materials management</p> <ul style="list-style-type: none"> direct and indirect effects from oil, fuel or other substances entering the aquatic environment <p>Diverted watercourses</p> <ul style="list-style-type: none"> action required to deter wildfowl from watercourse, and to avoid sight of a continuous water body 	<p>Use of vehicles</p> <ul style="list-style-type: none"> negative impact on flora and fauna from increased sediment loading of streams <p>Materials management</p> <ul style="list-style-type: none"> harm to aquatic flora and fauna from oil, fuel or other substances entering watercourses
	terrestrial ecology	<p>Earthworks and excavations</p> <ul style="list-style-type: none"> habitat removal, fragmentation or severance, hedge loss disturbance to, or loss of, species (including rare and sensitive species) 	<p>Physical presence of airport/airfield</p> <ul style="list-style-type: none"> alteration or loss of terrestrial habitats <p>Materials management</p> <ul style="list-style-type: none"> direct and indirect effects from oil, fuel or other substances entering the terrestrial environment <p>Operating regulations</p> <ul style="list-style-type: none"> trees lost due to height restrictions on flight paths trees lost or roosts destroyed to reduce risks of bird strikes 	<p>Earthworks</p> <ul style="list-style-type: none"> habitat restoration, removal of severance

Potential Receptors of Impact		Activities and Potential Impacts		
		Construction phase	Operation phase/on-going site maintenance	Decommissioning / Post-operation
HUMAN ENVIRONMENT	socio-economic ¹	Earthworks and excavations <ul style="list-style-type: none"> disruption of services such as electricity, gas, water, or telecommunications due to the presence of underground cables and pipes construction-related employment Negative publicity <ul style="list-style-type: none"> migration of people away from proposed airport/airfield site 	Airport/airfield operations <ul style="list-style-type: none"> continued migration of people away from the site large number of direct and indirect employment opportunities 	Restoration design and after-use <ul style="list-style-type: none"> public perception of the area may improve following sensitive restoration plans potential for large numbers of job losses
	health and safety ¹	Earthworks and excavations <ul style="list-style-type: none"> risk of injury on construction site Negative publicity <ul style="list-style-type: none"> adverse reaction to perceived health issues stress due to perceived problems (e.g. reduction in house values, pollution) 	Airport operation <ul style="list-style-type: none"> risk of accidents introduction of disease through airport air pollution leading to breathing difficulties 	Earthworks <ul style="list-style-type: none"> risk of injury on site
	amenity	<ul style="list-style-type: none"> direct loss of amenity sites, such as, fishing ponds, woodlands, parks severance from amenity 	<ul style="list-style-type: none"> alteration of rights of way or reduction in access 	Restoration design <ul style="list-style-type: none"> provision of amenity/recreational area
	nuisance	Use of vehicles and machinery <ul style="list-style-type: none"> noise from construction traffic and operations mud on roads 	Airport/airfield activities <ul style="list-style-type: none"> noise odour light from the site itself at night 	Use of vehicles and machinery <ul style="list-style-type: none"> noise from traffic and operations mud on roads
	architectural and archaeological heritage ¹	<ul style="list-style-type: none"> damage to known or unknown features of archaeological or cultural importance 	<ul style="list-style-type: none"> further damage to archaeological features resulting from expansion of the site 	

Additional site specific issues:

¹ The Agency considers that key impacts to be identified and assessed are likely to include the following, but further advice and guidance should be sought from the relevant competent authority, as included in the Scoping Handbook.



4. Mitigation measures

- 4.1 Following the scoping exercise and the identification of potential environmental effects, mitigation measures should be proposed to avoid or reduce potential negative impacts to air, water, land, ecology and humans, or to introduce positive aspects to the development. For example, such measures could aim to improve local amenity with off-site pond construction. Guidance has been provided by the Environment Agency to assist developers on a range of relevant subjects in the form of Pollution Prevention Guidelines (see “References and Further Reading” in the Scoping Handbook). Other relevant publications are detailed in Section Five.
- 4.2 A primary consideration in impact mitigation must be the siting of an airport or airfield. The development should avoid damage to important ecological sites and high quality landscapes. Also, it is Environment Agency policy to seek the preferential location of potentially polluting developments in areas which are not vulnerable to groundwater pollution (Environment Agency, 1998a). It is strongly recommended, therefore, that developers undertake an assessment of alternative sites.

Mitigating the impacts of construction activities

- 4.3 Construction activities have the potential to affect all environmental receptors. However, the following list summarizes the mitigation measures most relevant to airport and airfield developments:
- ◆ phasing of construction work to minimize disturbance to wildlife at sensitive times of year, such as during the breeding season or when young are being raised;
 - ◆ use of techniques to minimize compaction of soil, such as restricting access during wet conditions, and using protective boarding and low ground pressure machinery. If necessary, soil should be carefully removed and stored for subsequent reinstatement;
 - ◆ use of dust control strategies;
 - ◆ storage of fuel, equipment and construction materials so as to minimize the risk of soil contamination or water pollution (see Environment Agency Pollution Prevention Guideline 1, *General Guide to the Prevention of Water Pollution*);
 - ◆ setting the route and timing of construction traffic so as to avoid residential areas or other sensitive human receptors (e.g. schools, hospitals, nursing homes);
 - ◆ access roads should avoid riparian zones and should be built using appropriate construction materials;
 - ◆ runoff from the construction site should be stored prior to release to a watercourse to avoid peak runoff rates and to allow silt to settle out;
 - ◆ the physical habitat and morphology of all watercourses to be affected should be assessed prior to approval of the works, with all subsequent diversions or modifications being required to incorporate features which replace, if not enhance, the physical habitat and morphology which is lost (restoration / enhancement schemes on watercourses adjacent to the airport site should be considered where appropriate).

Mitigating the impacts of the operational phase

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- 4.4 Although sensitive siting and design of an airport or airfield are the primary means for avoiding or reducing its environmental impacts, further measures can be introduced to minimize impacts occurring from the ongoing management of the site. An overall consideration for the proposed airport or airfield is that its design and operation are in accordance with planning conditions and other relevant legislation. Developers should seek independent legal advice to ensure that all legal requirements relating to the proposed development are identified and complied with.
- 4.5 The measures have been arranged according to their primary receptor, however it should be noted that many of the following mitigation measures are inter-related. For example, correct handling and storage of chemicals, plus bunding to contain spills, would serve to reduce the impacts of such an incident on soils, surface and ground waters, and ecology.

Protecting the water environment

- 4.6 In order to minimize potential impacts on the water environment in the design and running of airports and airfields must ensure that:
- ◆ an appropriate water management system is used, including, for example, efficient land drainage and the use of constructed ponds for receiving site runoff to reduce the impact of runoff on nearby water courses;
 - ◆ Sustainable Drainage Systems (SuDS) should be used to alleviate flooding, improve water quality and ensure recharge of groundwater base flows;
 - ◆ hazardous or potentially polluting materials such as fuel, oil or wastes must be sited on an impervious base away from water, properly bunded, and kept locked when unattended;
 - ◆ less polluting and less hazardous de-icers are used (e.g. glycol-free);
 - ◆ all discharge waters are treated prior to discharge in to controlled waters;
 - ◆ oil/water separators are used or drip trays are used in vehicle parking areas, and are inspected and cleaned regularly;
 - ◆ a risk assessment is carried out to consider the implications of accidents – particular on take-off when fuel loadings are high, and the appropriate containment measures installed;
 - ◆ an Emergency Plan is formulated and tested through exercises to ensure that procedures to prevent or mitigate impacts due to accidents or spillages are in place and operate effectively (some developments may require such plans to be formulated and the Environment Agency should be consulted to identify where this is the case);
 - ◆ designated areas (ideally with connection to foul sewer) for disposal of spent or excess fire-fighting foams.

Protecting the land environment

- 4.7 Certain measures noted above for protecting the water environment, such as adequate bunding, will also reduce the likelihood of soil contamination. Impacts on soils and landscape may also be mitigated by the following:
- ◆ appropriate designs for buildings/structures on site;
 - ◆ appropriate screening for visual impacts;

- ◆ effective stabilisation of altered landforms so as to minimize soil erosion and the potential for water pollution from suspended solids;
- ◆ use of bunds / drip trays under stationary machinery to prevent oil and grease contaminating soil and groundwater.

Protecting the air environment

4.8 Developers should consider the aspects of the development that are likely to lead to air emissions. Such aspects will include aircraft emissions, volatiles from aircraft cleaning / paint stripping and land-based transport emissions. Suitable mitigation measures may include the use of extraction systems for aircraft maintenance including scrubbers, and the planting of trees to compensate for releases of carbon dioxide. A particular mitigation measure is:

- ◆ airport/airfield operating practices designed to reduce aircraft idling times.

Protecting ecology

4.9 Measures designed to prevent or reduce impacts to water or land will also benefit ecological populations. The following list identifies further strategies for reducing or avoiding impacts to terrestrial and aquatic species and their habitats:

- ◆ habitat features which will be destroyed can be recreated at a suitable location off-site, for example, ponds at a site well away from the aircraft flightpath;
- ◆ further habitats should be created to compensate for habitat losses and to improve the landscape and ecological potential for the site;
- ◆ restoration plans should incorporate measures to improve the ecological status of the former airport/airfield;
- ◆ good emergency planning for dealing with accidents and spillages designed to take account of likely pollution.

Protecting the human environment

4.10 Some of the measures noted above can also reduce possible impacts on humans, notably the risk assessment and emergency planning measures. Further mitigation measures more specific to the human environment are listed below:

- ◆ management operations should aim to minimize disturbance to adjacent residential and recreational uses (for example, less idling of aircraft on the ground);
- ◆ safety concerns should be addressed by such measures as implementing strict health and safety procedures for waste handlers, and the installation of adequate fencing and other site security to prevent trespass and vandalism;
- ◆ sensitive sound insulation grant programmes should be operated;
- ◆ training programmes should be instigated to ensure that a large development makes the best use of the locally-available workforce;
- ◆ sites of archaeological or cultural interest should be preserved *in situ* where possible. As relocation is rarely possible, thorough archaeological investigations should be carried out where damage is unavoidable.

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